

(RESEARCH ARTICLE)



The status of the use of traditional and modern methods in the management of malaria in some communities in Badagry Division, Lagos State, Nigeria

Sahdat Ajoke Salami ¹ and Okwa Omolade Olayinka ^{2,*}

¹ Department of Biology and Integrated Science, College of Science Education, Lagos State University of Education, Nigeria.

² Department of Zoology and Environmental Biology, Faculty of Science, Lagos State University, Nigeria.

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Abstract

Malaria is a leading parasitic disease in Nigeria and the risk exist throughout the country. This study examined the status and use of traditional and modern methods in malaria management in five communities in Badagry Division of Lagos State, Nigeria. Structured questionnaires were used to collect data from 100 participants, with 20 randomly selected from each community. Data analysis revealed that 85% of the respondents were knowledgeable of the relationship between malaria and mosquitoes. 66% believed that modern methods is better for preventing mosquitoes. 44% believed that traditional methods work faster and 56% felt that this method is cheaper for mosquito control while 15% nurture mosquito' repellant plants within their vicinity. 43% considered malaria to be a serious disease with fever as the most recognized symptom among 50%. 35% preferred the home treatment by nurses due to promptness and cheaper charges while 59% practiced self-medication. 55% preferred treating malaria with modern medicines because of safety and specificity. 41% preferred both herbal and modern medicines which they believed work together to manage malaria better. 7% never used modern drugs because they believe herbs are more effective. Amatem (11%) was the most preferred drug among 12 commonly used modern drugs. 12% still used chloroquine because of its affordability and 21% preferred injections. Health care workers are needed to reduce long waiting times in hospitals in order to curb self-medication. Herbal treatment appears as alternative to modern treatment so traditional practitioners should receive standard training in clinical medicine. Modern health practitioners should appreciate the potential of traditional practitioners and collaborate in malaria management.

Keywords: Herbal medicines; Modern medicines; Malaria treatment; Malaria management; Nigeria

1. Introduction

Human malaria is a leading parasitic disease which is caused by Protozoa of the family Plasmodidae and genus *Plasmodium*. Five species of *Plasmodium* parasitizes humans such as *P. falciparum*, *P. ovale*, *P. malariae*, *P. vivax* and the zoonotic *P. knowlesi* of Southeast Asia [1]. Okwa and Savage [2] reported that *P. falciparum* is the most virulent of the malaria parasites in sub-Saharan Africa including Nigeria where malaria is holoendemic.

Nigeria, where this study emanated from is a malaria endemic country with its entire population (>186 million) at risk of contracting malaria and a whopping 76% of this population is at high risk [3]. In 2015, Nigeria contributed to about 29% of the malaria cases and 26% of the malaria deaths worldwide [1]. These large figures imply that Nigeria's success in tackling malaria control will play a large part in the actualization of the global goals.

Malaria has afflicted man for ages but humans have always make efforts to remedy the situation in order to regain a healthy life. Past studies revealed that the earliest form of healing substances had been herbal medicines, but with the

* Corresponding author: Okwa Omolade Olayinka
Department of Zoology and Environmental Biology Lagos State University, Nigeria.

advent of civilization which had led to better scientific understanding of diseases and medications, orthodox medicines have become the main and well recognized products for the management of diseases in modern health systems [4, 5].

According to Mahomoodally [6] herbal medicines include herbs, herbal materials, herbal preparations, and finished products that contain parts of plants or other plant materials as active ingredients. Modern medicines on the other hand are chemically pure substances which when administered into the body produce pharmacological effects which may consequently lead to alleviation of the disease or help in the diagnosis or prevention of the disorder [7].

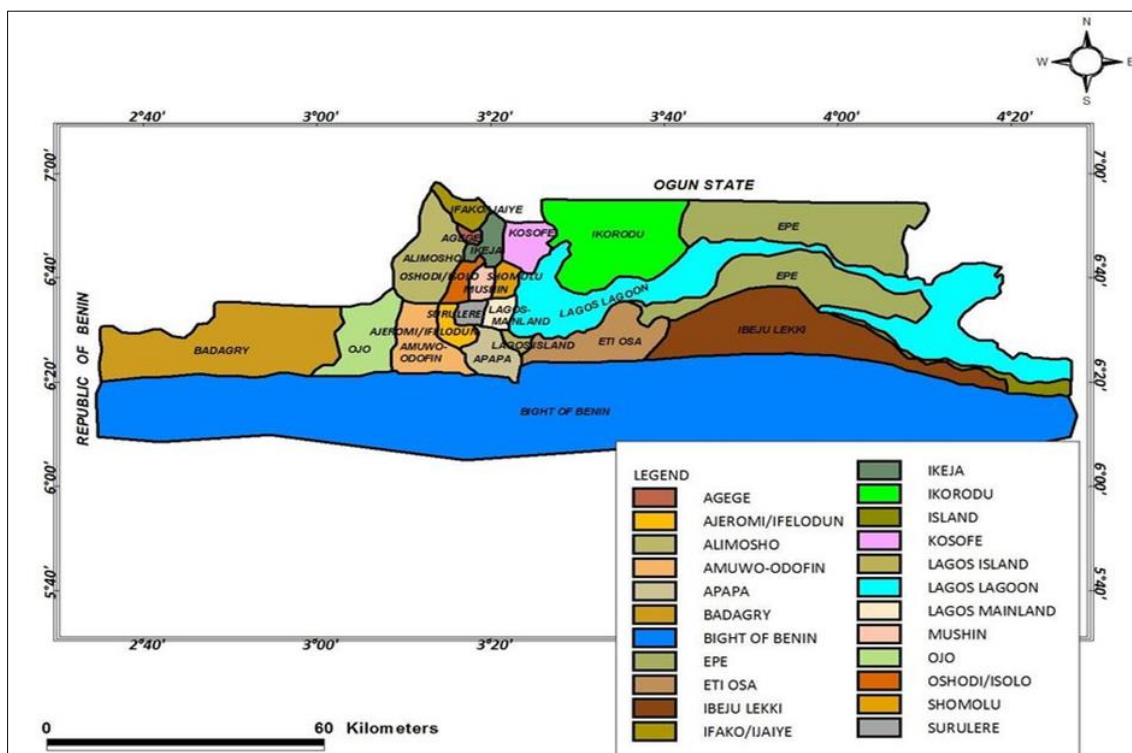
According to the World Health Organization despite the introduction of modern medicines, up to 80% of Africans still used traditional medicines, especially herbal medicines for their primary health care needs [8]. This present study aimed at ascertaining the status of the use of traditional and modern methods in the management of malaria in some communities in Badagry division of Lagos State, Nigeria. To achieve this aim, we ascertained the health seeking behavior of participants by investigating the preferred method for prevention and treatment of malaria and efficacy of the preferred methods. This study further determined the prevailing modern or herbal treatment types in the area.

2. Methodology

2.1. Study Communities

This survey was conducted in the Badagry Division of Lagos State, Nigeria. The communities selected for this study were: Ajara- Badagry, Otto-Ijanikin, Etegbin-Shibiri, Ojo and Oriade, The selected communities covers about 80% of Badagry Division of Lagos State and covers two LGA's and four Local Council Development Areas (Figure 1).The five communities were selected because this aided the random selection of participants from different backgrounds into the study.

These five communities lacked standard road networks, pipe-borne water, drainages and standard health care facilities and majority of the residents were low income earners. The participants cut across all the three major tribes in Nigeria and few from the neighbouring countries like Republic of Benin, Togo and Ghana. The majority of the residence were self-employed, traders or small and medium scale enterprises.



Source: www.lagosstate.gov.ng (Ministry of Physical Planning and Urban Development, Lagos State).

Figure 1 Map of Lagos State showing all Divisions (Including Badagry Division)

2.2. Determination of Study Population

Determining the appropriate sample size to represent the realities of the population being studied was derived by the formula of Lwanga et al [9].

$$\text{Sample size is derived by } n = Z_{\text{score}}^2 * \sigma^2 / E^2$$

Given that n = Sample size

Z score= confidence interval score

σ^2 = square of standard deviation

E^2 = square error rate

Therefore, at 95% confidence level, confidence interval = 1.96 and error rate is 4

$$n = 1.96^2 * 20.4^2 / 4^2$$

$$3.84 * 416.16 / 16$$

$$3.84 * 26.01 = 99.88$$

Sample size n is approximately 100

2.3. Selection of Participants

One hundred (100) participants were recruited into the study consisting of twenty (20) residents who were selected randomly from each of the five study communities. The inclusion criteria was permanent residence in the community, informed consent and willingness to fill the questionnaire

2.4. Validation, Pretesting and Pilot study

The structured questionnaire had 3 pages with five sections and 13 questions with options. Ten copies of the questionnaires were administered to two respondents each in the five study communities. This helped to identify sensitive, ambiguous, complex or repetitive questions. The questionnaires were then vetted, modified, corrected and hence validated. Questions were asked on respondents' data, environmental management, knowledge of malaria and the preferred treatment. The questionnaire also elicited information about the preferred methods for the prevention and control of malaria.

2.5. Administration of Questionnaires

During the actual survey, information about the aim of the survey was provided to the participants. They were informed that the questionnaire was solely for research purpose. The questionnaire was introduced to each respondent by explaining to them the importance and how it will help the government to make informed decisions about health policies. An average of 15 minutes was spent by participants in responding to the questions. The questionnaire was self-administered and the language of communication was English, pidgin or Yoruba depending on which was convenient for the respondent.

2.6. Statistical Analysis

The data from the questionnaires were gathered for analysis, represented in tables and expressed as percentages (%) for each of the five communities and the overall population. Chi square (χ^2) was used to determine statistical differences in results. Level of significance was estimated at 5% with 95% confidence interval (C.I). Probability (P value) was determined by $P < 0.05$ as significant and $P > .05$ as not significant.

3. Results

3.1. Respondents demographic data

Out of one hundred (100) individuals selected for this study, the gender difference was 45% male and 55% female. The difference was not statistically significant ($P > 0.05$) and this indicated that both genders are almost equally represented. The age distribution showed that 18 – 20 were (38%), 21 – 30 were (34%), 31 – 40 were (21%), 41 – 50 (6%) and 50 above was only (1%). The educational levels of the respondents were primary level (1%), secondary level (25%), and

tertiary level (75%). Majority (92%) were Nigerians spread across various ethnicity in the country while (8%) were non-Nigerians from neighbouring countries (Table 1). Table 1 also shows the respondents data across the five communities

3.2. Respondent's knowledge of mosquitoes and malaria

A proportion of respondents (43%), considered malaria to be a serious disease, (40%) thought it is a mild illness, (10%) alleged it is an infection but (7%) considered malaria to be all of the above. Regarding the relationship between mosquitoes and malaria, (85%) of the respondents reported that malaria is caused by mosquitoes and 66% believed that modern methods is better for preventing mosquitoes. Misconceptions about the cause of malaria was (2%) among those that thought that malaria infects humans when they stand under the sun while, (10%) suggested that dirty environments causes malaria. Only (1%) thought that malaria results from eating too much palm oil. Fever was the most recognized symptom of malaria among 50% of the respondents (Table 2). Table 2 also shows the respondents knowledge of malaria across the five communities.

3.3. Beliefs on Malaria prevention and treatment methods

On the better method of repelling mosquitoes, (22%) did not believe in the traditional methods while (17%) did not know what to believe. Although (61%) of the respondents believed in the traditional method of prevention only (27%) considered traditional method as the better. While (66%) of respondents opined that modern methods are better, only (7%) were indifferent (Table 3).

The choice of measures taken to curb mosquitoes revealed that (15%) of the respondents nurture mosquitoes repellent plants within their vicinity, (12%) burnt incense, (9%) burnt the peel of oranges, (6%) rubbed essential oils (e.g. eucalyptus oil, peppermint oil) and (24%) used a combination of some of the above methods while (34%) never did. A proportion of (44%) respondents believed that traditional methods work faster and (56%) felt that the method is cheaper, on the other hand (81%) believed that modern method is better but (6%) did not believe while (18%) were neutral.

For modern methods, (20%) believed that it is safer compared to traditional methods, (20%) declared that the method is tested and trusted considered it to be better certified (25%). 17% asserted that it is because tests are being carried out before drugs are administered while (18%) do not use modern methods at all (Table 3). Table 3 also shows the respondents beliefs on Malaria prevention and treatment methods across the four communities.

Table 1 Respondent Demographic Parameters

Profile	Options	Ajara-Badgary N (%)	Etegbin- Shibiri N (%)	Otto -Awori N (%)	Ojo N (%)	Oriade N (%)	Total N (%)	P-values
Gender	Male	12 (6)	7(35)	9 (45)	5 (25)	12(60)	45(45)	DF=1
	Female	8 (40)	13 (65)	11 (55)	15(75)	8 (40)	55(55)	P >0.05
Age	18 – 20	9 (45)	8(40)	5(25)	8(40)	8(40)	38 (38)	DF = 4 P <0.05
	21 – 30	7(35)	6(30)	7(35)	7 (35)	7(35)	34 (34)	
	31 – 40	3 (15)	5 (25)	5(25)	4 (20)	4 (20)	21 (21)	
	41 – 50	1 (5)	1 (5)	2(10)	10 (5)	1 (5)	6 (6)	
	>50	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	1 (1)	
Educational Level	Primary	1 (5)	0 (0)	0 (0)	0 (0)	0 (0)	1(1)	DF = 3 P <0.05
	Secondary	6 (30)	5 (25)	3(15)	6 (30)	5.0 (25)	25 (25)	
	Tertiary	13 (65)	15 (75)	17 (85)	14 (70)	15 (75)	74 (74)	
Nationality	Nigerian	13 (65)	20 (100)	19 (95)	20 (100)	20 (100)	92 (92)	DF = 1
	Non - Nigerian	7 (35)	0 (0)	10 (5)	0 (0)	0(0)	8(8)	P <0.05
Population		20	20	20	20	20	100	

3.1. Preferred methods of treating malaria

A proportion of respondents (45%) indicated that they used traditional methods to treat malaria, while (55%) used modern methods (Table 3). Out of the (45%) that used traditional methods, (51%) used herbal concoction, (19%) used herbal extract, (22%) used herbal tea and (8%) used a combination of the aforementioned methods (Table 4).

Out of the (55%) that preferred modern medicines, (1%) used Camosunate, (6%) used Lonart, (6%) specified Combisunate, (2%) preferred P-Alaxin, (11%) chose Amatem, (8%) used Lumatem, (4%) used Artemether – L, (7%) used Atesunate, (4%) used Coartem, (12%) still use chloroquine while (21%) preferred malaria injections.

However, (10%) use a combination of injection and other drugs, while (8%) do not use modern medicines for malaria. A proportion of (59%) of the respondents declared that they practiced self-medication while (41%) indicated that they never did, and (86%) declared that they seek medical help when they have malaria. Out of the respondents who sought medical help, (40%) sought help from orthodox doctors, (12%) patronized herbalist, (13%) go to native doctors and (35%) sought help from nurses (Table 4). Table 4 also shows the respondents preferred methods of treatment across the five communities.

Table 2 Respondent's Knowledge of Mosquitoes and Malaria

Questions	Options	Ajara-Badagry N (%)	Etegbin-Shibiri N (%)	Otto - Awori N (%)	Ojo N (%)	Oriade N (%)	Total N (%)	P- values
What is malaria?	Serious disease	8 (40)	9 (45)	8 (40)	11(55)	7 (35)	43 (43)	DF = 3 P <0.05
	Mild illness	8 (40)	7 (35)	10 (50)	5 (25)	10 (50)	40 (40)	
	Infection	2(10)	3(15)	1(5)	2(10)	2(10)	10(10)	
	All of the above	2 (10)	1(5)	1 (5)	2 (10)	1 (5)	7 (7)	
What causes malaria?	Mosquitoes	17 (75)	18 (90)	18 (90)	16 (80)	16 (80)	85 (85)	DF = 4 P <0.05
	Standing under sun	0(0)	0(0)	0(0)	1 (5)	1 (5)	2 (2)	
	Dirty environment	2 (10)	2 (10)	1 (5)	2 (10)	3 (15)	10 (10)	
	Eating too much palm oil	2 (10)	2 (10)	1 (5)	2 (10)	2 (10)	1 (1)	
	Others	1 (5)	2 (10)	2 (10)	1 (5)	2 (10%)	2 (2)	
How do you know when you have malaria?	Fever	12 (60)	12(6)	10 (50)	11 (55)	5 (25%)	50 (50)	DF= 3 P <0.05
	Headache	3 (15)	4 (20)	5 (25)	6 (30)	8 (40%)	26 (26)	
	Body and joint ache	2 (10)	1 (5)	3 (15)	2 (10)	3 (15%)	11 (11)	
	Shivering	1 (5)	3 (15)	2 (10)	1 (5)	2 (10)	9 (9)	
	Others	2(10)	0(0)	0(0)	0(0)	2 (10)	4 (4)	
What is the best way to prevent mosquito?	Traditional	10(50)	6(30)	4(20)	4(20)	3(15)	27(27)	DF= 2 P <0.05
	Modern	7(35)	12(60)	15(75)	16(80)	16(80)	66(66)	
	Don't know	3(15)	2 (10)	1 (5)	0 (0)	1 (5)	7 (7)	
Population		20	20	20	20	20	100	

Table 3 Beliefs on Malaria Prevention and Treatment methods

Questions	Options	Ajara-Badagry N (%)	Etegbin-Shibiri N (%)	Otto-Awori N (%)	Ojo N (%)	Oriade N (%)	Total N (%)	P values
Do you believe in traditional method of preventing mosquitoes?	Yes	16(80)	14(70)	11(55)	12(60)	8(40)	61(61)	DF = 2 P <0.05
	No	2(10)	4(20)	3(15)	5(20)	8(40)	22(22)	
	Don't know	2(10)	2(10)	6(30)	3(15)	4(20)	17(17)	
Do you believe in modern method of preventing malaria?	Yes	18(90)	19(95)	20(100)	20(100)	20(100)	97(97)	DF = 2 P <0.05
	No	1(5)	1(5)	0(0)	0(0)	0(0)	2(2)	
	Don't know	1(5)	0(0)	0(0)	0(0)	0(0)	1(1)	
How do you best treat malaria?	Traditional method	12(60)	8(40)	10(50)	10(50)	5(25)	45(45)	DF=1 P >0.05
	Modern method	8(40)	12(60)	10(50)	10(50)	15(75%)	55(55)	
Population		20	20	20	20	20	100	

Table 4 Preferred methods of treating malaria

Questions	Options	Ajara-Badagry N (%)	Etegbin-Shibiri N (%)	Otto-Awori N (%)	Ojo N (%)	Oriade N (%)	Total N (%)	P values
What traditional method of treatment do you use for malaria?	Herbal concoction	6(30)	10(50)	11(55)	12(60)	12(60)	51(51)	DF= 4 P <0.05
	Herbal extract	6(30)	4(20)	2(10)	3(15)	4(20)	19(19)	
	Herbal tea	5(25)	4(20)	6(30)	4(20)	3(15)	22(22)	
	All the methods	3(15)	2(10)	1(5)	1(5)	1(5)	8(8)	
What Malaria treatment do you use?	Camosunate	0(0)	0(0)	1(5)	0(0)	0(0)	1(1)	DF= 14 P <0.05
	Lonart	1(5)	1(5)	1(5)	2(10)	1(5)	6(6)	
	Combisunate	1(5)	1(5)	2(10)	0(0)	2(10)	6(6)	
	P-Alaxin	0(0)	0(0)	0(0)	1(5)	1(5)	2(2)	
	Amatem	1(5)	2(10)	3(15)	2(10)	3(15)	11(11)	
	Lumatem	1(5)	1(5)	1(5)	3(15)	2(10)	8(8)	
	Artemisinin	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	
	Artemether-L	0(0)	1(5)	1(5)	1(5)	1(5)	4(4)	
	Artesunate	0(0)	1(5)	2(10)	1(5)	3(15)	7(7)	
	Anate	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	
	Coartem	1(5)	1(5)	2(10)	0(0)	0(0)	4(4)	
	Injection	6(30)	7(35)	3(15)	3(15)	2(10)	21(21)	
	Chloroquine	2(10)	3(15)	2(10)	3(15)	2(10)	12(12)	
	Do not use modern drugs.	5(25)	1(5)	0(0)	1(5)	1(5)	8(8)	
Combination of drugs	2(10)	1(5)	2(10)	3(15)	2(10)	10(10)		

4. Discussion

This study compared the status of the use of herbal and modern medicines amongst the residence of five sub-urban communities in Badagry division of Lagos state, Nigeria. All the socio-demographic characteristics of respondents except the area of residence had no association with respondents' concurrent usage of herbal and modern medicines. This age distribution suggested that of the respondents were youths so were very active and enlightened and as such were able to respond to all the questions appropriately. It seemed that the geographical location or community of the respondents was the only factor associated with the concurrent use of herbal and modern methods for malaria management.

This survey revealed that the reasons for the preference of modern treatment of malaria was its safety and the fact that it is tested, trusted and certified because tests are being carried out before prescription of drugs. This is in line with a study in communities in Orlu Local Government Area of Imo state and Abuja, Nigeria where 70.4% and 86.3%, respectively, opted first for modern medicines [10, 11]. Furthermore, this study showed that most of the respondents actually preferred the services of nurses who gave injections than going to hospitals due to the convenience of home treatment and cheaper charges compared to hospitals with long waiting time before seeing a doctor.

The survey revealed that some respondents (12%) still used chloroquine as their drug of choice for the treatment of malaria and this is surprising because ACTs had replaced chloroquine in Nigeria several years ago because of drug resistance. Amatem is the most popular ACT of choice amongst the respondents, this they said is due to the affordability and availability. This is similar to the observations of Okwa et al [12] who reported Amatem as the preferred drug among University students.

In this present study, 59% of respondents practice self-medication. Likewise, Okwa et al [12] reported in a study that 31% of students self-medicated. Also, 55% treated malaria with modern medicines while only 7% indicated that they do not use modern medicines at all while 41% combined both methods of treatment. Also Okwa et al [12] reported in a study that 80%, of students use herbal mixtures. However, self-medication should be discouraged among the masses.

Metaprim a common chemoprophylaxis drug which is taken weekly is no longer a drug of choice amongst this population. This study also inferred that both modern and traditional methods were employed in prevention and treatment of malaria as it is believed to work together. It might be due to unsatisfactory results from the use of either one as a first choice of treatment. This finding is supported by the results of Ameade *et al.*, [13] who reported that both hospital and herbal clinic attendees' topmost reason for opting for herbal medicines was that they were more effective than modern drugs. It was reported in that study that about a fifth (17.9%) of respondents were concurrently using both herbal and modern medicines which is lower than results from countries such as Nigeria, Kenya, and Norway where between 25% and 69.4% concurrently used both herbal and modern medicines [10, 11]. The possible reason for the lower rate in Ameade's study could be because the responses given by the participants were in relation to the concurrent use of both forms of medication for the ailment for which they had gone to seek healthcare but most other studies questioned respondents if they had ever concurrently used herbal and modern medicines [13].

Several studies in Nigeria found an association between concurrent use of herbal and modern medicines and several socio-demographic characteristics including age, sex, level of education and income level [10,11]. These results suggested that even if a large proportion of the respondents believed in the traditional methods of preventing malaria, majority of them still preferred to use the modern preventive methods. The study also showed that those that use traditional methods preferred a combination of herbs and similarly those that use the modern methods preferred a combination of drugs. Lack of satisfaction with modern medicines and high cost had also been found to be a major reason for people opting for herbal medicines [14].

5. Conclusion

The knowledge on the breeding sites of mosquitoes and the relationship between malaria and mosquitoes is a positive factor that will trigger the environmental management of the vectors in endemic communities. More health care workers are needed to reduce the long waiting times in the hospitals and curb the menace of self-medication. Herbal medicine appears to be an alternative to modern medicines so traditional practitioners should receive standard training in clinical medicine while modern health practitioners should appreciate the potential of traditional practitioners and the possibility of collaboration in malaria management. The nurturing of mosquito repellent plants around home should be encouraged. There should also be more knowledge towards complementary and alternative medicine. There is need

for intensified health education so that indiscriminate use of herbal mixtures be regulated among the masses. These measures are in line with the goals of the National malaria strategic plan to ensure the elimination of malaria in Nigeria.

Compliance with ethical standards

Acknowledgments

We thank the community leaders and the participants of the five communities Ajara- Badagry, Otto-Ijanikin, Etegbin-Shibiri, Ojo and Oriade for their willingness and time in filling the questionnaires.

Disclosure of conflict of interest

The authors: Sahdat Ajoke Salami and Omolade O. Okwa declare that there is no conflict of interest.

Statement of ethical approval

We were guided by the ethical principles that are based on human rights and protection of respondents during this survey such as voluntary participation, safety and respect of persons. The questionnaire was made anonymous and the personal information was kept confidential. The participants were accorded due respect and assured of total confidentiality.

Statement of informed consent

Informed consent and approval were obtained from the participants before the administration of questionnaires.

Authors Contributions

Omolade .O Okwa designed the research, validated the questionnaire. Sahdat Ajoke Salami interpreted the results, administered the questionnaires and carried out the data analysis. Both complied the work and edited and proof read the manuscript.

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